Claims

1. A negative pressure booster comprising at least a valve body which is reciprocally disposed in the inside of a shell, a power piston which is mounted in the valve body and partitions the interior of the shell into a constant pressure chamber into which negative pressure is introduced and a variable pressure chamber into which atmosphere is introduced at the time of operating the negative pressure booster, a valve plunger which is connected to an input shaft and is slidably disposed in the inside of the valve body, a vacuum valve which controls the communication or the interruption between the constant pressure chamber and the variable pressure chamber, and an atmospheric valve which controls the interruption or the communication between the variable pressure chamber and at least the atmosphere due to the operation of the valve plunger, wherein

the negative pressure booster further includes a stroke shortening mechanism which shortens a manipulation stroke quantity of the input shaft in an output region with an output larger than a given output than the manipulation stroke quantity of the input shaft in the output region with the output larger than the given output when the manipulation stroke quantity of the input shaft is changed at a change rate of the manipulation stroke quantity of the input shaft with respect to the output in an output region with an output equal to or

below the given output.

2. A negative pressure booster according to claim 1, wherein the stroke shortening mechanism is atmospheric valve opening quantity increasing means which is operated in the output region with the output larger than the given output and increases a valve opening quantity of the atmospheric valve larger than the valve opening quantity during the usual operation, and the operation of the atmospheric valve opening quantity increasing means is controlled in response to pressure corresponding to the input.

3. A negative pressure booster according to claim 2, wherein the pressure which controls the operation of the atmospheric valve opening quantity increasing means is pressure of the variable pressure chamber.

4. A negative pressure booster according to claim 3, wherein the vacuum valve includes a valve element and a vacuum valve seat on which the valve element is detachably seated and, the atmospheric valve includes the valve element and an atmospheric valve seat on which the valve element is detachably seated, and the atmospheric valve opening quantity increasing means includes a valve seat member which has the vacuum valve seat mounted on one end side thereof, wherein

the valve seat member is mounted in the valve body movably between a first position which is positioned in the output region with the output equal to or below the given output and

a second position which is positioned in the output region with the output larger than the given output, and the movement of the valve seat member is controlled in response to the pressure of the variable pressure chamber.

5. A negative pressure booster according to claim 4, wherein the movement of the valve seat member is controlled in response to the pressure difference between the variable pressure chamber and the constant pressure chamber.